

and bleaching which are required after nitration. Except where cotton is to be used for making a white artificial leather, the question of color is not of the highest importance. Nevertheless, it is desirable to give the material a very thorough treatment in the boiling tubs, and produce a cotton which can be used on any grade of artificial leather. Opinion varies as to the importance of stability in nitrocellulose to be used for this purpose, but it is generally acknowledged that an unstable product will cause cracking of the film in the finished leatherette.

It is to be noted that the stabilization and pulping processes have a decided lowering effect on the viscosity of nitrocellulose, so that in making a cotton to meet a specified viscosity this element must be taken into account. Also this effect can be utilized to reduce the viscosity where it is found to be too high.

The test for ash is of minor importance where the nitrocellulose is to be used for the manufacture of artificial leather. Nevertheless, it is always made, as an excessive ash indicates the presence of too much dirt. A good grade of soluble cotton should not have over 0.4 per cent ash.

SOLVENTS

In making up solutions for the manufacture of artificial leather, two solvents are very generally used: acetone oils and ethyl acetate. The commercial acetone oils consist largely of methylethylketone, with some acetone and higher ketones, as well as small quantities of condensation products, such as mesityl oxide. The non-solvents are usually benzene or benzine. As nitrocellulose is usually shipped wet with denatured alcohol, this latter material is nearly always present in the final solution. Although not a perfect solvent for nitrocotton, alcohol tends to lower the viscosity of a solution. A typical artificial leather solution rarely contains more than 30 per cent acetone oils or other solvent, the remainder consisting of benzene, etc. This percentage is often reduced even to 10 per cent.

It used to be considered necessary to have present a certain amount of high boiling solvent, such as amyl acetate, ethyl propionate, etc., but most manufacturers now get along without its presence, and some claim that such a solvent actually tends to produce pinholes in the finished leather. This, they think, is caused by the higher boiling solvent remaining in the coat until most of the other solvents and non-solvents have evaporated. The non-use of high boiling solvent is, of course, made possible only by the use of a mixture in which the boiling point of the solvent is higher than that of the non-solvent, or where their boiling points are very nearly the same, as otherwise the rate of evaporation of the solvent during the drying process would be greater than that of the non-solvent. In such a case a point would be reached where the percentage of non-solvent would be high enough to precipitate part of the nitrocotton and cause blushing of the film and a consequent flaking off of the coat.

The solutions usually used by manufacturers have a viscosity of about 40 sec. It is interesting to note that the solvents and non-solvents used have a decided effect on the viscosity of a solution. In general, it may be stated that solvents of higher molecular weight make a more viscous solution when nitrocotton is dissolved in them than do those of lower molecular weight. Thus, solutions in ethyl propionate, ethyl butyrate, butyl acetate, or amyl acetate are of higher viscosity than solutions of the same nitrocellulose in acetone or ethyl acetate. The introduction of any non-solvent always increases the viscosity of the resultant solution. Thus, nitrocellulose which will give the standard 16-oz. solution a viscosity of 20 sec. when dissolved in a mixture of 70 per cent ethyl acetate and 30 per cent benzene will give a viscosity of about 40 sec. when the percentage of benzene is

70 and that of the ethyl acetate 30.

Solutions in which the viscosity is too high are generally known as "short" solutions. "Granular" solutions are those which are hazy and in which all the nitrocellulose has not dissolved. These latter are usually caused by either over- or under-nitration of the cotton, making it partly insoluble in the usual solvents.

There exists a good deal of difference of opinion as to the relative advisability of using a 16-oz. solution or one where the nitrocotton content is higher, such as a 20- or 24-oz. solution. The majority of manufacturers seem to use the 16-oz. solution, but there are notable exceptions. Men well up in the business declare that the cost of manufacture depends largely on cost of materials, the labor element being small. It would appear on the surface, then, that if an artificial leather of the same weight could be made by the application of fewer coats of a dope containing more nitrocotton, considerable economy might be effected in the saving of solvents. However, there are a good many factors to consider. A 24-oz. solution would have to be considerably richer in solvents to give a viscosity of 40 sec. than a 16-oz. solution giving the same viscosity. That is, the proportion of cheap non-solvent would have to be decreased, and the mixture would rise in cost per gallon. Reducing the viscosity of the cotton used would not be very advantageous, as the extremely low viscosity cotton is uneconomical to manufacture on account of the low yields and danger of fires. Some also claim that the heavier solutions tend to produce more pinholes in the finished goods. Probably there is room for difference of opinion on this point, and a practical man who has developed a good product using a certain weight solution is naturally averse to making a change. After the nitrocellulose and the solutions are brought up to a satisfactory standard, a great deal has yet to be done to turn out a high-grade artificial leather, and it is here that the actual practical operator has a field for valuable experimental work.

Monthly Statistical Service on Production and Stocks of Sulfuric Acid and Nitric Acid

The Department of Commerce, through the Bureau of the Census, is preparing to issue monthly reports on the production and stocks of sulfuric acid and nitric acid. Secretary Hoover has been assured of the coöperation of the manufacturers of these products, and Mr. Stuart, Director of the Census, is consulting them as to the form of schedule that will yield the required data with least inconvenience to the industry. The data secured from firms and corporations will be held as confidential, totals only being published.

The purpose of the Department in issuing monthly reports of this character is to assist in the stabilization of industry by furnishing such aid as may be possible by the dissemination of information necessary to intelligent procedure. The undertaking is endorsed by the Manufacturing Chemists' Association, and by many officials of corporations engaged in the production of these acids. This is an opportunity for the chemical industry to secure an important service from the Department of Commerce, and it is recommended that all manufacturers who receive the schedule give it prompt attention and assist in the compilation of reports that can be distributed shortly after the end of the month to which the figures relate.

Insecticide and Disinfectant Manufacturers Association

The recent meeting of the Insecticide and Disinfectant Manufacturers Association at Atlantic City, June 13 and 14, 1921, was a success from the point of view of attendance and interest shown. Among the guests who addressed the Association was Mr. W. D. Hartley, representative of McDougall Bros., Ltd., Manchester, England, who discussed informally trade conditions in England.